Metratec HF AT Protocol Guide

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1. General Information

This document describes the low-level protocol used by Metratec HF multi-protocol devices of the current generation (starting from 2023).

These include:

- DeskID NFC

- QR NFC

- Dwarf NFC

You only need to use this protocol if you need (or want) direct low-level access to the reader via the AT commands. In most cases, using one of our free libraries or SDKs is the easier way to talk to our products. These are available for Java, .NET (C#, etc.), Python and Ansi-C (for Posix and Microcontrollers).

1.1. AT Protocol Definition

All Metratec RFID products from 2023 onwards are controlled by a simple to use and human-readable AT protocol - similar to LTE modems and many other communication devices. The commands are easy to read ASCII code and are just sent via UART, Serial oder a TCP Socket to the device.

The command structure follows the usual AT command conventions. These are:

- Each command is finished with a Carriage Return (CR) or 0x0D in hex notation.

- Each answer contains a result block and a status code block (OK or ERROR) and is framed by Carriage Return + Line Feed (CR+LF) or 0x0D+0x0A in hex notation.

- Optionally you can activate the Echo Mode where each command is repeated with the response to allow easy parsing in asynchronous systems.

- Integrated help using "=?" behind the command, eg. **AT+PWR=?**

Protocol Format Examples:

1. Single-line answer to AT+MOD=ISO15, no command echo active

```
Command:
AT+MOD=ISO15<CR>

Response:
<CR><LF>
OK<CR><LF>
```

1. Single-line answer to AT+MOD=ISO14A, with command echo active

```
Command:
AT+MOD=ISO14A<CR>

Response:
<CR><LF>
AT+MOD=ISO14A<CR><LF>
OK<CR><LF>
```

1. Multi-line answer to AT+INV, no command echo active

```
Command:
AT+INV<CR>

Response:
<CR><LF>
+INV: E002ABDE4321<CR>
+INV: E002ABFF2111<CR>
+INV: E002ABDC1234<CR><LF>
OK<CR><LF>
```

1. Multi-line answer to AT+INV, with command echo active

```
Command:
AT+INV<CR>

Response:
<CR><LF>
AT+INV<CR><LF>
+INV: E002ABDE4321<CR>
+INV: E002ABFF2111<CR>
+INV: E002ABDC1234<CR><LF>
OK<CR><LF>
```

For better readability, the CR and CR+LF are not shown in the following command examples.

1.2. Migrating from the prior protocol

Previous versions of the Metratec products used a similar but slightly different low-level protocol. This had a number of issues which have been solved by this new protocol. The most important change is that responses now have a unique identifier (eg. +INV für Inventory), so asynchronous events during continuous scanning our IO events are much easier to parse. Additionally you can activate a command echo for even more clarity. Lastly, the device has a more helpful response if commands are not sent as expected.

1.3. Tools

The easiest way to send ASCII Text to our devices is using a terminal program, eg. metraTerm 2, which can be downloaded for free from our website at https://www.metratec.com

2. Device Settings

These commands are basic commands to control the device itself. Not all commands are supported by every hardware, eg. for controlling pins or beepers.

2.1. AT / Basic AT Test

A standard command which can be used to test basic communication (eg. whether you use the right baudrate in a serial device). This command always answers with "OK" and nothing else.

```
Command:
AT

Response:
OK
```

2.2. ATI / Device Information

This command is a general AT command that returns information on the device including hardware name and version, firmware name and version as well as the serial number of the device. This is a general AT command and therefore not separated by a +.

```
Command:
ATI

Response:
+SW: <Software Name + Version>
+HW: <Hardware Name + Version>
+SERIAL: <Serialnumber>
OK
```

2.3. ATE(0/1) / Command Echo

This command activates or deactivates the Command Echo Mode. This is a general AT command and therefore not separated by a +. User ATE0 to deactivate the mode and ATE1 to activate it.

```
Disable echo:
ATE0

Enable echo:
ATE1

Response:
OK

Get current value:
ATE?
```

2.4. AR+SUS / Start Up Sound

This command enables or disables the startup sound. The parameter is boolean. 0 disables the sound, 1 enables it.

```
# Write Command
Command:
AT+SUS=0

Response:
OK

# Read Command
Command:
AT+SUS?

Response:
+SUS: 1
OK
```

2.5. AT+RST / Reset

This command resets the device.

```
Command:
AT+RST

Response:
OK
```

2.6. AT+HBT / Heartbeat Messages

This command controls the asynchronous Heartbeat settings (in seconds). Set to 0 to turn off. If activated, the device sends a +HBT every x seconds to show the host that the device is still alive. This is mainly useful for TCP connections where a interface interuption is hard to detect otherwise.

```
Command:
AT+HBT=0-60

Response:
OK
```

3. RFID Settings

With the following commands you can configure the behavior of the RFID modem of the reader.

3.1. AT+CW / Continuous Wave

This command turns the RF field on or off. This can be used to manually repower (and thus reset) a transponder.

Example:

```
Turn field off:
AT+CW=0

Turn field on:
AT+CW=1

Response:
OK

Get current state:
AT+CW?

Response:
+CW: <state>
OK
```

3.2. AT+MOD / Operation Mode

This command sets the operation mode of the reader (the used ISO Protocol). Default value is AUTO. For some other commands, you need to select the right mode to work. All protocol specific commands are note available in AUTO mode.

The following modes are supported:

- AUTO
- ISO15
- ISO14A

Example:

```
Command:
AT+MOD=ISO14A

Response:
OK

Get the current mode:
AT+MOD?

Response:
+MOD= ISO14A
OK
```

3.3. AT+CRI / Configure Radio Interface

This command is only available in ISO15 mode. It configures the modulation and subcarrier to communicate with the tag. Most modern tags use single subcarrier and 100% ASK modulation (which is the default). If you have a transponder that uses double subcarrier or 10% ASK (mainly old transponders), use this commands to switch the mode.

The modulation options are:

- 10
- 100

The subcarrier options are:

- SINGLE
- DOUBLE

Example:

```
ASK100 modulation with single subcarrier:
AT+CRI=SINGLE,100

Response:
OK

Get the current configuration:
AT+CRI?

Response:
+CRI: SINGLE,100
```

```
OK
```

4. Tag Operation

The commands in this chapter all work in connection with one of more transponders. They are the most used commands during RFID operations.

4.1. AT+INVS / Inventory Settings

This command is used to configure the behavior and response format of inventory commands like AT+INV or AT+CINV. The parameters are Tag Details, Only New Tags and Single Slot.

If tag details is set to 1 additional information about the tag is included in the inventory response. The tag details vary for the different modes. In ISO15 mode the additional details include the DSFID. In ISO14A mode the additional details include the SAK and the ATQA. If tag details is used in AUTO mode, the response will contain the tag family as an additional response parameter after the UID.

Only new tags filter only has an effect in ISO15 mode. If it is set to 1 a Stay Quiet is sent to each tag in the field after an successful inventory. This has the effect that any tag that remains in the field is only found once in an inventory.

The single slot option only has an effect in ISO15 mode. If it is set to 1 ISO15 inventories will be run in single slotted mode, resulting in faster inventories. There will be no anti-collision loop performed so an inventory with multiple tags in the field will result in failure.

Example:

```
Command:
AT+INVS=1,0,0

Response:
OK
```

4.2. AT+INV / Inventory

Makes a single (blocking) inventory. This command is used to read the UID of tags in field. Depending on the selected mode (AT+MOD) only tags of the specified protocol are detected. In AUTO mode tags of all supported protocols are detected but it takes more time because both modes need to be scanned. The response format depends on the inventory settings (AT+INVS) and can contain additional information. The additional information is not present in AUTO mode. For more details see AT+INVS.

Example:

```
# Inventory settings: 0,0,0

Command:
AT+INV

Response:
+INV: E00212345678
+INV: E00212345679
+INV: E00212345670
OK

# ISO15 mode and inventory settings: 1,0,0

Response:
+INV: E00212345678,00
+INV: E00212345679,DE
OK

# ISO14A mode and inventory settings: 1,0,0

Response:
+INV: B384D9AE,08,0400
OK

# AUTO mode and inventory settings: 1,0,0

Response:
+INV: B384D9AE,ISO14A,08,0400
+INV: E00212345679,ISO15,DE
OK
```

Example for a successful inventory, but with no tags in the field:

```
Command:
```

```
AT+INV

Response:
+INV: <NO TAGS FOUND>
OK
```

4.3. AT+CINV / Continuous Inventory

This command starts a continuous inventory scan. Since this is a continuous command, the result "OK" is only returned once and immediately. After that, the reader prints out results until the mode is stopped (see AT+BINV).

Example:

```
Command:
AT+CINV

Response:
OK

+CINV: E00212345678
+CINV: E00212345679
+CINV: E00212345670
+CINV: <ROUND FINISHED>
```

4.4. AT+BINV / Break Continuous Inventory

This command stops any previous continuous scans (see AT+CINV).

Example:

```
Command:
AT+BINV

Response:
OK
```

4.5. AT+READ / Read Tag Data

This command is used to read out data from the tag. This works only with ISO15693 (iCode, Tag-It, etc.), NXP Mifare Classic, Mifare Ultralight and NTAG transponders (which is all NFC tags).

The parameters are the memory block to read and the optional option flag. The length of a block and thus the response depends on the type of the tag. Refer to the tags datasheet for details. In ISO14443-A mode the tag first has to be selected with AT+SEL.

The option flag is the ISO15693 request option flag and is only available in ISO15 mode. If it is omitted it is set to 0 implicitly. When reading with the option flag enabled, the block security status byte is added as additional response parameter.

Examples:

```
Command:
# Read without option flag
AT+READ=0

# Read with option flag
AT+READ=0,1

Response:
# Without option flag
+READ: 01020304

# With option flag
+READ: 01020304,00

OK
```

4.6. AT+READM / Read Multiple Blocks of Tag Data

This command is used to read out multiple blocks of data from the tag. This works only with ISO15693 (iCode, Tag-It, etc.) and NTAG.

The parameters are the memory block to start, the number of blocks to read and the optional option flag. This command will respond with one line per block. The length of a block depends on the type of the tag. Refer to the tags datasheet for details. In ISO14443-A mode the tag first has to be selected with AT+SEL.

The option flag is the ISO15693 request option flag and is only available in ISO15 mode. If it is omitted it is set to 0 implicitly. When reading with the option flag enabled, the block security status byte is added as additional response parameter.

Examples:

```
Command:
# Read without option flag
AT+READM=0,4

# Read with option flag
AT+READM=0,4,1

Response:
# Without option flag
+READM: 01020304
+READM: 05060708
+READM: 090A0B0C
+READM: 0D0E0F10

OK

# With option flag
+READM: 01020304,00
+READM: 05060708,00
+READM: 090A0B0C,00
+READM: 0D0E0F10,00

OK
```

4.7. AT+WRT / Write Tag Data

This command is used to write data to a block of the tags memory. The parameters are Block, Data and the optional option flag. The data is represented as readable HEX. This will only work with ISO15693, NXP Mifare Classic, Mifare Ultralight and NTAG tags. At every time a full block has to be written. Refer to the tags datasheet for the block size. In ISO14A mode the tag first has to be selected with AT+SEL.

The option flag is the ISO15693 request option flag and is only available in ISO15 mode. If it is omitted it is set to 0 implicitly.

Example:

```
Command:
# Write without option flag
AT+WRT=0,01020304

# Write with option flag
AT+WRT=0,01020304,1

Response:
OK
```

4.8. AT+SEL / Select Tag

This command is used to select a tag by its UID. For ISO14443-A tags a select is mandatory before performing any operations on the tag. In ISO15693 a select is optional and can be used to filter read and write operations. If no tag is selected in ISO15 mode, the operations are performed on every ISO15693 tag in the field. The parameter of select is the tag UID which you can get with AT+INV.

Example:

```
Command:
AT+SEL=DACF3B0E

Response:
OK
```

4.9. AT+DEL / Deselect Tag

This command is used to deselect a selected tag (see AT+SEL). This command has no parameters.

Example:

```
Command:
AT+DEL

Response:
OK
```

4.10. AT+DTT / Detect Tag Type

This command is used to detect the type of tags in the field. The response contains the tag uid, tag type and, if available, its memory size in bytes (B) or kilobytes (K). The possible tag types this command can return are shown in the table below.

DTT Response	Tag Type
ISO15	ISO15 Tags
MFC	Mifare Classic
MF_MINI	Mifare Mini
TagNPlay	?
MF_UL	Mifare Ultralight
MF_UL_EV1	Mifare Ultralight EV1
MF_UL_C	Mifare Ultralight C
MF_UL_NANO	Mifare Ultralight Nano
MF_HOSPITALITY	Mifare Hospitality
NTAG_2XX	Ntag 213/215/216
NTAG_4XX	Ntag 424/426
MF_PLUS	Mifare Plus
MF_PLUS_EV1	Mifare Plus EV1
MF_PLUS_EV2	Mifare Plus EV2
MF_PLUS_S	Mifare Plus S
MF_PLUS_X	Mifare Plus X
MF_PLUS_SE	Mifare Plus SE
MF_DESFIRE_EV1	Mifare Desfire EV1

DTT Response	Tag Type
MF_DESFIRE_EV2	Mifare Desfire EV2
MF_DESFIRE_EV3	Mifare Desfire EV3
MF_DESFIRE_LIGHT	Mifare Desfire Light

Example:

```
Command:
AT+DTT

Response:
+DTT: 814C7732977C04,NTAG_213
+DTT: AB01DBCE,MFC_1K
+DTT: E00222350442296D,ISO15

OK
```

5. ISO15693 Commands

The following commands are exclusively for ISO15693 tags, like NXP Icode, Texas Instruments Tag-It, Fujitsu MB89 tags, etc.

5.1. AT+RRQ / Read-alike Request

Send a request with read-alike timing to an ISO15693 transponder. Refer to AT+WRQ for further details.

5.2. AT+WRQ / Write-alike Request.

Send a request with write-alike timing to an ISO15693 transponder. The request is given as a hex-string. Refer to the ISO15693 for documentation of the request string itself.

Example:

```
Command:
AT+WRQ=022B

Response:
+WRQ: 0F40294204352202E000003F0322
OK
```

5.3. AT+AFI / Configure the Application Family Identifier

This command is used to set the "Application Family Identifier" (AFI) for ISO15693 inventories. An AFI of 0 is treated as no AFI set. If set to non-zero only transponders with the same AFI will respond in a inventory. The AFI is hexadecimal and ranges from 00 to FF.

Example:

```
Write Command:
AT+AFI=1F

Write Response:
OK

Read Command:
AT+AFI?
```

```
Read Response:
+AFI: 1F
OK
```

5.4. AT+WAFI / Write AFI

This command is used to write the AFI of an ISO15693 transponder. The parameters are the AFI and the option flag. The AFI is hexadecimal and ranges from 00 to FF. The option flag is the ISO15693 request option flag.

Example:

```
Command:
AT+WAFI=AF,0

Response:
OK
```

5.5. AT+LAFI / Lock AFI

This command is used to permanently lock the AFI of an ISO15693 transponder. The parameter is the option flag.

Example:

```
Command:
AT+LAFI=0

Response:
OK
```

5.6. AT+WDSFID / Write DSFID

This command is used to write the "Data Storage Format Identifier" (DSFID) of an ISO15693 transponder. The parameters are the DSFID and the option flag. The DSFID is hexadecimal and ranges from 00 to FF.

Example:

```
Command:
AT+WDSFID=AF,0
```

```
Response:
OK
```

5.7. AT+LDSFID / Lock DSFID

This command is used to permanently lock the DSFID of an ISO15693 transponder. The parameter is the option flag.

Example:

```
Command:
AT+LDSFID=0

Response:
OK
```

6. ISO14A Commands

The following commands are only available in ISO14443-A mode. The commands are grouped by the tag sub-types they are for.

6.1. Generic ISO14A Commands

These commands can be used on any ISO14A tag.

6.1.1. AT+REQ14 / Request

This command is used to send a raw ISO14A request to a previously selected tag. The parameter is the raw request string in ASCII Hex representation.

Example:

```
# Get Version on a NTAG213

Command:
AT+REQ14=60

Response:
+REQ14: 0004040201000F03
OK
```

6.2. Mifare Classic Commands

The following commands are available on NXP Mifare Classic Cards. Before using any of the following commands the tag has to be selected with AT+SEL.

6.2.1. AT+AUT / Authenticate

This command is used to authenticate with a Mifare Classic Card. The parameters are the block to authenticate, the MFC key and the key type. The key is exactly 6 bytes long and the key type is either A or B. This command has to be executed before performing any operations on the Mifare Classic Card.

Example:

```
Command:
AT+AUT=5,FFFFFFFFFFFF,A

Response:
OK
```

6.2.2. AT+AUTN / Authenticate with Stored Key

The DeskID NFC can store Mifare classic keys in non-volatile memory. This command is used to authenticate with a stored key at index N in the keystore. The parameters are the block to authenticate and the index of the stored key in the keystore.

Warning: Storing keys in the flash is not suitable for high security systems since the values can be read out from the flash with the right tools. If you need high security, please buy the -S (secure) option of the products with integrated SAM chip.

Example:

```
Command:
AT+AUTN=5,1

Response:
OK
```

6.2.3. AT+SIK / Set Internal Key

This command is used to store a key in the internal key store of the DeskID NFC. The parameters are index, key and key type. The indexes range from 0 to 16. The key is exactly 6 bytes long and the key type is either A or B.

Example:

```
Command:
AT+SIK=1,112233445566,A

Response:
OK
```

6.2.4. AT+GAB / Get Access Bits

This command is used to get the access bits for a Mifare Classic block. The parameter is the block number. The response contains the access bits for the corresponding block. Please refer to the Mifare Classic documentation for the meaning of the access bits. Note that the access conditions differ for data blocks and the sector trailer.

Example:

```
Command:
AT+GAB=6

Response:
+GAB: 000
OK
```

6.2.5. AT+SKA / Set Keys and Access Bits

This command is used to set the keys and access bits for a Mifare Classic Block. Note that in Mifare Classic Blocks are grouped in sectors of 4 blocks. The keys are set for the whole sector, not for a single block in the sector. The access bits however are set block-wise. Make sure you are using the same keys if you set the access bits for different blocks in the same sector. The parameters of this command are block number, key1, key2 and access bits.

Example:

```
Command:
AT+SKA=5,112233445566,77889900AABB,001

Response:
OK
```

6.2.6. AT+SKO / Set Keys Only

This command is used to set the keys for a Mifare Classic block. Note that in Mifare Classic Blocks are grouped in sectors of 4 blocks. The keys are set for the whole sector, not for a single block in the sector.

The parameters of this command are block number, key1 and key2.

Example:

```
Command:
AT+SKO=5,112233445566,77889900AABB

Response:
OK
```

6.2.7. AT+WVL / Write Value Block

This command is used to create a Mifare Classic Value block. The parameters are block number, initial value and address. The initial value is a signed 32 bit integer. The address byte stores the address of a block used for backup.

Example:

```
Command:
AT+WVL=4,32,5

Response:
OK
```

6.2.8. AT+RVL / Read Value

This command is used to read the value of a Mifare Classic value block. The command parameter is the block to be read. The response parameters are the value and the address set on creation of the value block.

Example:

```
Command:
AT+RVL=4
```

```
Response:
+RVL: 32,5
OK
```

6.2.9. AT+IVL / Increment Value

This command is used to increment the value of a Mifare Classic block. The parameters are the block number and the amount to increment by. Note that this operation only will have an effect after AT+TXF is executed.

Example:

```
Command:
AT+IVL=4,3

Response:
OK
```

6.2.10. AT+DVL / Decrement Value

This command is used to decrement the value of a Mifare Classic block. The parameters are the block number and the amount to decrement by. Note that this operation only will have an effect after AT+TXF is executed.
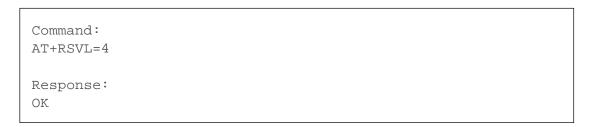
Example:

```
Command:
AT+DVL=4,3

Response:
OK
```

6.2.11. AT+RSVL / Restore Value

This command is used to restore the value of a Mifare Classic block. The parameter is the block number. Note that this operation only will have an effect after AT+TXF is executed.

Example:

```
Command:
AT+RSVL=4

Response:
OK
```

6.2.12. AT+TXF / Transfer

This command is used to write pending transactions to a block. The parameter is the block number to write to.

Example:

```
Command:
AT+TXF=4

Response:
OK
```

6.3. NTAG / Mifare Ultralight Commands

The following commands are available on NTAGs and Mifare Ultralight cards. Before using any of the following commands the tag has to be selected with AT+SEL.

6.3.1. AT+NPAUTH / Password Authenticate

This command is used to authenticate with an NTAG. After the authentication password protected pages can be accessed. The parameter is the password. It is exactly 4 bytes long. The response will contain the configured password acknowledge.

Example:

```
Command:
AT+NPAUTH=11223344

Response:
+NPAUTH: ABCD
OK
```

6.3.2. AT+NPWD / Set Password and Password Acknowledge

This command is used to set the password and the password acknowledge for NTAG. The parameters are the 4 byte password and the 2 byte password acknowledge.

Example:

```
Command:
AT+NPWD=11223344,ABCD

Response:
OK
```

6.3.3. AT+NACFG / NTAG Access Configuration

This command is used to get or set the NTAG access configuration. The parameters are shown in the table below. Note that the changes are only activated after a power cycle of the tag.

Parameter	Range	Description
AUTH0	4-255	Page address from which password authentication is required.
PROT	0-1	0: Writes are protected by password; 1: Reads and writes are protected by password.
AUTHLIM	0-7	Limit for negative verification attempts. 0 disables this functionality.

Example:

```
# Set Command

Command:
AT+NACFG=4,1,0

Response:
OK

# Get Command

Command:
AT+NACFG?

Response:
+NACFG: 4,1,0
OK
```

6.3.4. AT+NMCFG / NTAG Mirror Configuration

This command is used to get or set the NTAG mirror configuration. The parameters are shown in the table below. Note that the changes are only activated after a power cycle of the tag.

Parameter	Range	Description
Mirror Mode	OFF, UID, CNT, BOTH	The mirror mode.
Mirror Page	4 - (Last Page - 3)	The start page where the configured data is mirrored to.
Mirror Byte	0-3	Offset of the mirrored data in the Mirror Page.

Example:

```
# Set Command

Command:
```

```
AT+NMCFG=BOTH,4,0

Response:
OK

# Get Command

Command:
AT+NMCFG?

Response:
+NMCFG: BOTH,4,0
OK
```

6.3.5. AT+NCCFG / NTAG Counter Configuration

This command is used to get or set the NTAG counter configuration. The parameters are shown in the table below. Note that the changes are only activated after a power cycle of the tag.

Parameter	Range	Description
CNT_EN	0-1	Set to 1 to enable the NFC counter.
CNT_PWD_PROT	0-1	Set to 1 to enable password protection for the NFC counter.

Example:

```
# Set Command

Command:
AT+NCCFG=1,0

Response:
OK

# Get Command

Command:
AT+NCCFG?

Response:
```

```
+NCCFG: 1,0
OK
```

6.3.6. AT+NDCFG / NTAG Modulation Configuration

This command is used to get or set the NTAG modulation configuration. The parameter is boolean. If set to 1 strong modulation is enabled, otherwise it is disabled. Note that the changes are only activated after a power cycle of the tag.

Example:

```
# Set Command

Command:
AT+NDCFG=1

Response:
OK

# Get Command

Command:
AT+NDCFG?

Response:
+NDCFG: 1
OK
```

6.3.7. AT+NCLK / Lock NTAG Configuration

This command is used to permanently lock the NTAG configuration. Note that the changes are only activated after a power cycle of the tag.
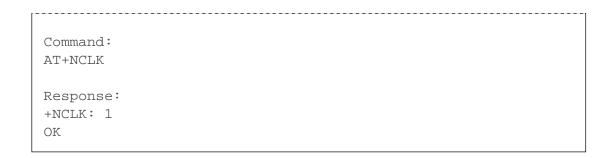
Example:

```
# Run Command

Command:
AT+NCLK

Response:
OK

# Read Command
```

```
Command:
AT+NCLK

Response:
+NCLK: 1
OK
```

6.3.8. AT+NCNT / Read NFC Counter

This command is used to read the NFC counter of an NTAG. If password protection is enabled for the counter AT+NPAUTH has to be executed prior to this command.

Example:

```
Command:
AT+NCNT?

Response:
+NCNT: 12
OK
```

6.3.9. AT+NLK / Lock Page

This command is used to lock a NTAG page. The parameter is the page number. Page 3 to 15 can be locked individually. This lock is irreversible. All other pages are then grouped and can only be locked as groups. The group size depends on the NTAG type. Refer to the NTAG datasheet for details.

Example:

```
Command:
AT+NLK=16

Response:
OK
```

6.3.10. AT+NBLK / Lock Block Lock

This command is used set the block-lock bits. The block-lock bits are used to lock the lock bits. Refer to the NTAG datasheet for details. The parameter of this command is the page number to lock the lock bits for.

Example:

```
Command:
AT+NBLK=16

Response:
OK
```

7. Feedback

The DeskID NFC has a built-in speaker that can be used to play predefined or custom note sequences. This can be useful to give the end user a quick feedback.

7.1. AT+FDB / Play Feedback

This command is used to play a predefined feedback sequence.

There are 3 predefined feedback sequences.

Number	Feedback
0	Startup jingle
1	OK Feedback
2	ERROR Feedback

Example:

```
Command:
AT+FDB=1

Response:
OK
```

7.2. AT+PLY / Play custom Feedback

This command is used to play a custom feedback sequence. The parameters are the sequence in string description, the number of times the sequence should be repeated and the length of a single step of the sequence in ms.

The format of the sequence string is described here. A note is always encoded by its name written as a capital letter and octave e.g. C4 or D5. Half-tone steps are encoded by adding a s or b to the note. For example Ds4 or Eb4. Note that Ds4 and Eb4 are basically the same note. A pause is denoted by a lowercase x.

Example:

```
Command:
AT+PLY=E5xE5xxxE5xxxC5xE5xxxG5xxxxxxG4,1,70

Response:
OK
```

7.3. AT+FRQ / Play a Frequency

This command is used to play a frequency on the buffer. The frequency is given in Hertz. To stop playback a frequency of 0 Hz should be issued.

Example:

```
Command:
AT+FRQ=440

Response:
OK
```

8. Version History

The following table shows the different version of this file.

Table 1. Version History

Version	Change	Changed by	Date
1.0	Initial Version / WIP	KD	19.3.2023
1.1	Added Release 1.0.0 Commands	LG	28.8.2023
1.2	Updated for Release 2.0.0 • Removed Desfire section • Removed Region command from example • Updated INVS command description for AUTO mode • Updated READ and READM commands • WAFI and WDSFID take hexadecimal parameters • Added FRQ command	LG	26.02.2024

Contact

Metratec GmbH
Niels-Bohr-Str. 5
39106 Magdeburg
Germany

Tel.: +49 (0)391 251906-00
Email: info@metratec.com

Metratec USA
6 Liberty Square #2073
02109 Boston, MA
United States

Tel.: +1 (857) 799-3795
Email: us@metratec.com

Web: https://www.metratec.com

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